Editor's note: Reconsideration denied; decision reaffirmed -- See 102 IBLA 162 (May 3, 1988); Appealed -- aff'd, Civ.No. 87-140-GF-PGH (D.Mont. Feb. 8, 1989)

UNITED STATES
v.
NORMAN A. WHITTAKER

IBLA 85-67 Decided January 29, 1987

Appeal from a decision by Administrative Law Judge Michael L. Morehouse finding valid mineral discoveries on the Iron King N and Fault lode mining claims. Montana 34612, 34613.

Affirmed in part, reversed in part.

1. Evidence: Prima Facie Case -- Mining Claims: Contests

When the Government contests a mining claim on a charge of lack of discovery of a valuable mineral deposit, it has the burden of going forward with sufficient evidence to establish a prima facie case. Where a Government mineral examiner testifies that he has examined the land within a claim and found the quantity and quality of the minerals insufficient to support a finding of discovery, a prima facie case is established.

2. Mining Claims: Discovery: Generally -- Mining Claims: Discovery: Marketability

The requirement that a mining claimant show that the mineral discovered on the claim is presently marketable at a profit simply means a mining claimant must show that, as a present fact, taking into consideration historic price and cost factors as well as the likelihood of their continuance or change, there is a reasonable likelihood of success that a paying mine can be developed.

3. Mining Claims: Discovery: Geologic Inference

Though geologic inference can be used, where exposures exist which show high and relatively consistent values, to infer sufficient quantity and quality of similar mineralization beyond the actual exposed areas such that a valuable mineral deposit may be said to exist,

> resort to geologic inference cannot be justified on the basis of data which is shown to be intrinsically flawed.

APPEARANCES: Sally Thane Christensen, Esq., Office of the General Counsel, United States Department of Agriculture, Missoula, Montana, for appellant Forest Service; Turner C. Graybill, Esq., Great Falls, Montana, for appellee Norman A. Whittaker.

OPINION BY ADMINISTRATIVE JUDGE BURSKI

The United States Forest Service (Forest Service), Department of Agriculture, has appealed from a decision by Administrative Law Judge Michael L. Morehouse, dated September 17, 1984, finding that patent should issue for the Iron King N and Fault lode mining claims, M.S. Nos. 10951 and 10955, located in sec. 6, T. 14 N., R. 11 E., Principal Meridian, Judith Basin County, Montana.

On July 1, 1976, Norman A. Whittaker, appellee herein, filed applications to patent the Iron King N and Fault lode mining claims. Final certificates for mineral entry issued February 14, 1977. Thereafter, the Forest Service initiated mineral examinations of the claims. On January 27, 1983, the Montana State Office, Bureau of Land Management (BLM), at the request and on behalf of the Forest Service, issued a contest complaint which charged that no discovery of a valuable mineral deposit existed within the limits of either claim and that the land embraced by both claims was non-mineral in character. In addition, the complaint also alleged, with reference to the Fault claim, that the material found thereon was a common variety mineral removed from location under the Act of July 23, 1955, 69 Stat. 368, 30 U.S.C. § 611 (1982), and further, that the Fault claim was not held in good faith for mining purposes.

A hearing on the contest was held September 14-21, 1983, at Great Falls, Montana. In his decision, the Judge discussed the testimony and exhibits in light of applicable law. 1/ As to both claims, he concluded that the evidence presented by appellee preponderated over the prima facie case of invalidity presented by the Forest Service. Accordingly, he found that patent should issue on both claims, all else being regular.

1/ At this point, we should make some mention of the fact that the transcript in this case is somewhat unusual. Rather than being numbered consecutively from the start of the hearing to the conclusion of the hearing, each volume (with one exception) recommences numbering at page 1. As an additional element for confusion, many of the volumes cover less than a complete day's testimony. Thus, for the hearing held on Sept. 20, 1983, there are three volumes of transcript, each of which commences at page 1. Apparently, Judge Morehouse, recognizing the potential for confusion, numbered each transcript in its proper sequential order from 1 to 12. We have followed this numbering in our citations, though we have substituted Roman numerals for the arabic numbers.

On appeal before the Board, the Forest Service contends that the decision is in error as to both claims. We will consider the assignments of error after setting forth the evidence adduced at the hearing.

Forest Service Mineral Examiner Robert Newman visited the claims on a number of occasions in 1977 and 1982. He took seven samples from the Iron King N and two samples from the Fault claim. The Iron King samples were assayed by the Bureau of Mines and the results of those assays show an iron content (Fe) varying between 33.5 and 64.7 percent (Exh. G-3, appendix 2; I Tr. 55), the average grade of the iron being 47.85 percent (II Tr. 12). Inasmuch as the claim embraced a magnetite deposit Newman also carried out a magnetic survey on the Iron King N. Such a survey, he testified, is generally accepted as a reliable indicator of magnetite iron deposits (I Tr. 28). He characterized the deposit on the Iron King N, as disclosed both by surface exposures and the magnetic survey, as a "finely crystalline magnetite" constituting a "small high-grade iron deposit" (I Tr. 25; Exh. G-3 at ii, 24).

With reference to the Fault claim, Newman testified that he saw no surface indications on the claim that iron ore was present (II Tr. 70-71). Therefore, he testified, he did not extend the magnetic survey across the Fault claim (II Tr. 71-72, 111-12; IV Tr. 151). Newman admitted, however, that an analysis of the magnetic survey readings showed that as the traverse lines approached the west sideline of the Iron King N claim, at a point relatively adjacent 2/ to the east endline of the Fault claim, the readings began to rise, showing increasing magnetic activity (IV Tr. 148-51). In explaining why he failed to continue the magnetic traverse across the endline of the Fault claim, Newman stated "I guess my judgment was when I was in the field that it wasn't warranted by the showings that I could see" (IV Tr. 155). Newman added that, even if traverse lines crossing the Fault claim had shown magnetic activity, this fact, by itself, would not impel him to the conclusion that a deposit of magnetite ore existed under that claim. As he explained: "The magnetometer alone wouldn't do that for me. I would have to correlate that with field observations, with pits, with samples or with drill hole data or all of the other observations that a person normally makes in this kind of investigation" (IV Tr. 156). Newman did admit, however, that high magnetometer readings would be a valuable indicator as to the possible presence of magnetite (IV Tr. 157).

Two samples were taken on the Fault claim. These were assayed for nonferrous minerals. One sample was taken of a clay deposit in the southeast

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2/ While Whittaker testified that it was his intent in locating the Fault claim that it abut and slightly overlap the west sideline of the Iron King N claim (IX Tr. 67), in actual fact, as surveyed, the two claims do not touch. See MS 10951 and MS 10955, Montana. At the hearing, a motion to amend the patent application was approved by Judge Morehouse (XII Tr. 168-69; Decision at 6). Such a course of action would, of course, necessitate a resurvey of the claim. However, for reasons which are made clear subsequently in our decision, we need not comment further on this question.

portion of the Fault claim, while the other was taken from a dolomite outcrop occurring near the west endline of the Fault claim (I Tr. 51). While Newman testified that the dolomite deposit was extensive, he stated that the clay deposit was a "very small exposure" (II Tr. 73). Newman declared that in his view there was nothing unique about these two deposits when compared to other deposits of clay and dolomite in Montana (II Tr. 77).

In order to arrive at an estimate of the development costs for the magnetite deposit on the Iron King N, Newman used what was referred to as the "Straam System." The Straam System is a Bureau of Mines cost analysis method for making preliminary estimates of mining, processing, and transportation costs. Newman explained that the system is based on actually experienced costs of mining operations, broken down into their discrete components such as drilling, blasting, loading, hauling, etc. (II Tr. 14; Exh. G-3, Appendix 5). Based on his own research, Newman estimated a mining cost of $37.25 per ton and a trucking cost to Stanford, Montana (the nearest railroad facility), of $9 to $10 per ton (II Tr. 30, 37-39). Newman did concede that the Straam System was based on assumptions which might not necessarily reflect accurately the situation of smaller operators such as appellee (IV Tr. 200-10). 3/

Newman noted that possible markets for magnetite consisted of steelmaking, coal cleaning, cement making, and animal feed supplements (II Tr. 46; III Tr. 11-21). As part of his marketability analysis, Newman sent letters of inquiry to several possible ore purchasers. In these letters he related the specifications of appellee's ore and described the deposit as a "high-grade magnetite deposit." One company, Oregon Steel Mills, called in response, indicating an interest in negotiating with a reliable shipper (Exh. G-3, Appendix 5; Exh. R-18). Newman also considered two Montana cement plants as possible markets. However, based on his estimate of the cost of mining and transportation, as compared to the prices these customers would be willing to pay, he concluded that the ore from the deposit could not be marketed at a profit (II Tr. 47, 56-60).

Robert Thompson, a Forest Service geologist, was also requested to perform a marketability study by Newman after appellee's patent applications were filed. Although Thompson visited the claims, he made no independent appraisal of iron content and relied in his evaluation on the reports of

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3/ Speaking of the limitations of the system, Newman testified:

"Many of the limitations are built right into it and you need to be making an estimate on the deposit that is similar to those that went into the basic data. You are limited by the amount of information you have. You are limited as to the size of operations which it can be applied to. You are limited to the restriction that you should not try to estimate discrete mining operation costs, and then apply a greater deal of confidence to that cost alone; that if you use it and estimate all costs for all of the discrete operations, and then sum them together that your total cost estimate should be fairly close. These are some of [the limitations]." (IV Tr. 249).

previous claim examiners (VIII Tr. 23-27, 30). He consulted trucking firms, cement plants, and steel plants to obtain his data. He set up five alternatives for mining and marketing: (1) construct a mine and reduction plant on the site as proposed by Whittaker in his patent applications, (2) ship unbeneficiated ore to a steel-making facility, (3) ship beneficiated ore to a steel-making facility, (4) market the iron ore for uses other than steel-making, (5) leave the iron ore in the ground and exploit the nonferrous minerals on the claims. His report states in part:

> The discussion and evidence presented in the Analysis of Alternatives suggests that the reduction plant operation proposed by Whittaker is a very unlikely, if not unfeasible, proposition. It is very unlikely that the reserves of iron on his property are sufficient to warrant the huge capital expenditures required for this type of operation. Mr. Whittaker has not demonstrated the feasibility of his proposal by using the standard procedure of constructing and evaluating a pilot plant prior to full-scale production. Mr. Whittaker has not supplied adequate data on operating and construction costs.
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> Discussion and evidence presented in the analysis also suggest that other operating alternatives on this property are unlikely or unfeasible. The economics of the iron mining industry are favorable toward very large operations supplying huge quantities of iron ore. The operations are large in order to justify the large capital investments required for mining beneficiating and transporting the iron ore. The reserves present in this deposit would not warrant the investment of large sums of capital. Furthermore, there is no market for iron ore from this site at the present time, either for uses in iron and steelmaking or for uses in cement manufacture of heavy-media aggregate.

(Exh. G-3, Appendix 3 at 8). Thompson conceded on cross-examination, however, that the deposit might be viable for use in coal cleaning, a market which he had not explored (VIII Tr. 56-57).

Ronald Hays, a mining and metallurgical consultant hired by the Forest Service, and the author of approximately 20 articles on iron ore, examined the claims in 1982 but took no samples (VIII Tr. 81). Hays discussed the historical development of steel-making processes from the original Bessemer process 4/ of the latter part of the 19th century to the use of the basic oxygen furnace (BOF) and the electric furnaces of today (VIII

4/ Hays noted that the Bessemer process was an acid process that did not remove phosphorous. As a result, it needed ores with low phosphorous content. This process, however, is no longer used (VIII Tr. 111). This point is of some relevance since a number of old publications, which appellee submitted as evidence in his case, suggested that the ores present on the Iron King N were suitable for use in the Bessemer process. See, e.g., Exh. R-14 at 91 (Westgate Report); Exh. R-70 at 3.

Tr. 86-95). Hays testified that, because of inadequate information as to the extent and quality of the deposit on the Iron King N, he was unable to definitively ascertain whether beneficiation of the ore would be necessary to make it suitable for steel-making purposes, though he felt that the indications were that it would be (VIII Tr. 101). With respect to the five alternatives suggested by Thompson, Hays stated that he thought none of them was viable, either because of insufficient reserves 5/ to justify the expenditures necessary to construct a pelletizing facility or because of the lack of a nearby market, which rendered the deposit uncompetitive because of increased transportation costs (VIII Tr. 106-08). He also stated that further sampling of the deposit was necessary in order to determine the variability in the material, its susceptibility to beneficiation techniques as well as its amenability to crushing and grinding (VIII Tr. 120-22). Hays did admit, on cross-examination, that the ore could theoretically be used as a cheap oxidizing agent in electric furnaces (VIII Tr. 149), though he questioned the size of such a market (VIII Tr 173-74).

Norman Whittaker, the patent applicant, who was also a member of the American Institute of Mining Engineers and a consultant on iron ore mining, testified that he had dug most of the workings on the Iron King N claim. Holes were drilled, overburden removed, and magnetite and hematite were found in the 1950's (IX Tr. 37, 58 et passim). A portion of the iron deposit, 50 feet thick, lay under 2 feet or less of overburden (IX Tr. 64). The first assays showed "58 to a 63 plus" percent Fe content (IX Tr. 52).

Whittaker testified that Norman Stines, a geologist employed by Morrison Knudsen Corporation, examined the claims in 1951. Whittaker stated that Stines' sample from the Iron King N assayed 52.23 percent Fe. Stines also described the Iron King N deposit as being 100 feet wide. He recommended mining it and suggested that the mining be carried out by open cut or quarrying methods (X Tr. 28, 33, 39; Exh. R-41 at 24, 40, 59).

Whittaker also testified that in 1954 about 3 tons of ore were shipped to the Atomic Energy Commission (AEC) in Richland, Washington. He was paid about $500 per ton (X Tr. 41). A subsequent shipment of 500 pounds went to Argonne National Laboratory in Lemont, Illinois. The Argonne assays showed 64 percent Fe (Exh. R-51). Thereafter, a railroad car load was shipped to Illinois. This event was marked by the Great Falls Tribune on April 22, 1956. See Exh. R-50B. Whittaker stated that he received $81 per ton for this ore (X Tr. 44). He also estimated that he sold a total of 3,200 tons of Iron King N ore to nuclear reactor contractors (XI Tr. 24), for use in shielding nuclear reactors.

5/ Hays estimated the reserves based on a dimension of 600 by 900 by 120 feet as totally 600,000 tons, assuming 5,000 pounds per cubic yard of density. Based on dimensions of 1,200 by 90 by 90 feet, he estimated reserves of 900,000 tons (VIII Tr. 124-25). This should be contrasted with the calculations of Andrew Kasamis, based on the same dimensions, discussed infra. It seems clear that Kasamis made an error in his estimates.

Whittaker testified that a shaft was dug on the Fault claim in 1955 or 1956 and that a type of iron used for pigments was encountered about 14 feet down (IX Tr. 70-71). This material, described as "limonite," a lowgrade iron ore used for its yellow pigments, was also found in a discovery cut on the claim (X Tr. 19). He also testified that a 188 foot hole was drilled on the Fault claim at a 30 degree angle. 6/ This hole encountered 12 feet of magnetite at the end of the hole (X Tr. 9-10). One other hole was drilled but no ore was encountered (X Tr. 12).

In 1957, E. R. Sievers, a minerals examiner employed by the Forest Service, examined a number of claims including the Iron King N and the Fault (X Tr. 79-80). In his report, dated May 23, 1957, Sievers wrote that magnetite and hematite had been discovered on the Fault claim and that a number of open cuts on the Iron King N also showed veins of magnetite and hematite. His report stated in part:

> At the present there is considerable evidence that the claim owner is trying to develop a commercial iron mine. He has leased the mineral to Mr. E. A. Young of Hibbing, Minnesota, who is apparently a reputable iron miner. Mr. Young's company has done considerable exploratory work. They have now moved a large amount of heavy equipment to the mine and ore is being shipped.
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> * * * The lode claims which were examined are considered valid as to discovery.

(Exh. R-1 at 4-5). The report indicated, however, that Sievers did not have assays run on any samples, instead relying on other geologic reports for determining the existence and extent of the mineral deposits on the claims (Exh. R-1 at 1-2).

Whittaker related that, in 1959, four carloads of material were removed from the Iron King N claim and shipped to steel companies and the AEC (IX Tr. 55, 58). Assays were run in 1958 and 1959 on ores from both claims by Lerch Brothers, Inc. The Iron King N assays showed 60.76 and 41.95 percent Fe. Samples from the Fault claim assayed 63.82 and 69.95 percent Fe (Exhs. R-52, R-54; X Tr. 58-59). The assays shown on Exh. R-54 came from samples taken from the 188 foot angled drill hole on the Fault claim (X Tr. 64). Whittaker testified that other assays were run by Lerch Brothers, Inc., but that the reports were lost because his home on the Fault claim was broken into and vandalized on numerous occasions (X Tr. 67-68). He stated further that Victor DeMunck, of the Montana Bureau of Mines and Geology, examined the claims and took samples (X Tr. 77). DeMunck described the ore as "a fine-grained intimate mixture of magnetite and hematite," the magnetite being

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6/ This drill site was actually off the claim, as shown in the mineral survey, being located between the east endline of the Fault and the west sideline of the Iron King N. See note 2 supra.

predominant (Exh. R-13 at 17). 7/ According to Whittaker's testimony, a magnetic survey performed by U.S. Steel showed a larger ore body on the Fault claim than on the Iron King N (XI Tr. 12-16; Exh. R-59). In 1959, assays run by U.S. Steel showed 70.60 and 68.50 percent Fe (Exh. R-60).

A 1960 report by the Forest Service Mineral Examiner R. W. Manchester stated, with respect to the Iron King N claim:

> Iron is the basis for discovery. The exposures of replacement magnetite as found did indicate a rather sizable deposit. Considerable oxidation was noted near the surface, but the magnetite still was very magnetic. Surface showings contain about 57% iron. From the results of the drill holes and magnetometer test, it appears that this deposit has as much promise as the iron ore that is presently being mined on Mr. Whittaker's patented claims.

(Exh. R-2 at 3).

In 1963, John Manning, a consulting engineer and geologist, rendered a preliminary valuation appraisal of the claims. He described the ores as fine-grained magnetite and some hematite and cited the assays done by Lerch Brothers. He characterized the ore as being "premium grade" and very desirable as a "sweetener" in steel-making. He stated that markets had already been established by the development of mining properties near the Whittaker claims, and that the ores could be extracted by open pit mining operations (Exh. R-43). Also in 1963, Georges Pannier, retired chief metallurgist for the French Government, took samples from the Iron King N claim (XII Tr. 13-14). His samples were assayed by Pacific Spectrochemical Laboratory and showed 68 percent Fe (Exh. R-66). According to Whittaker, Pannier thought the ore was of outstanding quality (XII Tr. 15).

In 1976, Whittaker and National Minerals Corporation (NMC) of Missoula, Montana, entered into an agreement to lease with an option to purchase the subject claims, among others. The purchase price for the claim group which included the Iron King N was stated as $250,000. NMC did not exercise the option to purchase for reasons, according to Whittaker, unrelated to the Whittaker transaction, but did make payments under the lease (Exh. R-68; XII Tr. 21).

7/ It should be pointed out, however, that the DeMunck investigation covered a number of claims in the Running Wolf Iron District, including three claims, investigated earlier by the Bureau of Mines, in an area generally known as Willow Creek, from which the Young Montana Corporation produced iron ore from 1954 to 1963. See VII Tr. 69; VIII Tr. 194-98; IX Tr. 17-22; X Tr. 48-56. Whittaker stated that between 300,000 to 500,000 tons of ore were shipped just to U.S. Steel by the Young Montana Corporation (X Tr. 53). Apparently, a very small amount of the sales and shipments involved actually consisted of ore from the Iron King N (X Tr. 53, 57).

Exhibit R-61 is a collection of numerous letters soliciting information from appellee concerning his ore. These inquiries, from various engineering and contracting firms, cover the period between 1957 and 1963. Many show a substantial interest in the Whittaker ores, requesting shipping specifications, indications of amounts available, and price quotations, inter alia. In 1978, Union Carbide, Inc., requested quotes for various types of ores, including limonite (Exhs. R-62A, B, C). One of the most recent inquiries came in 1983, during the course of the hearing, when Bethlehem Steel requested information about magnetite (Exhs. R-78, R-79; XII Tr. 164-65).

Andrew Kasamis, Vice President and Manager of Panamint Mining Company of California, saw the claims at issue in 1977 and several times thereafter (VI Tr. 9-10). He testified that he took samples on the Iron King N and his assays showed about 61 percent Fe (VI Tr. 16). Based on his mining experience, he estimated 2 million tons of ore in place on the Iron King N. However, upon hearing Newman's testimony that the deposit was 120 feet long, Kasamis recalculated the tonnage to "a lot more than two million tons" (VI Tr. 15-16). On the Fault claim, he saw "float" which he described as little pieces, chips of iron, on the surface. He was interested in the Whittaker deposit in 1977 because he wanted to fill large overseas orders (VII Tr. 37-38).

For purposes of the hearing, Kasamis prepared an estimate for mining and crushing 30,000 tons of ore from the two claims over a 37-day period (including 7 days to transport his equipment to the site (VI Tr. 31-32)). He could carry out the operation at a cost of $142,500 including a profit to himself of $69,000 (VI Tr. 22-35; Exh. R-23). He testified at some length as to how he arrived at his figures (see generally VI Tr. 28-50). He tried to lease the property in 1977, but at that time the lease between Whittaker and NMC was in effect. In 1977, he estimated that he could have mined the ores at a cost of about $1.60 per ton (VI Tr. 64). He was still interested in mining the claims at the time of the hearing and indicated that he believed it could be done at a profit (VI Tr. 66-68, 70).

Maurice Weissman, a Montana scrap iron operator and ore broker, testified that he was familiar with ore from the Whittaker properties (IX Tr. 8, 14). He thought the ore from the claims was valuable and could be marketed at a profit. At the time of the hearing he was involved in negotiations with a coal operator who wanted ore for coal cleaning purposes. He indicated that a "formidable" amount of material was sought, "a lot more than" 10,000 tons (IX Tr. 15, 25, 31).

Jerry Prouse, operator of the Storm King Coal Mine in Roundup, Montana, testified that magnetite, in solution, is used in the cleaning of coal (IX Tr. 78). After his facility obtained a coal washer, he would be happy to purchase Whittaker ore at the latter's offering price of $66 per ton (IX Tr. 82). He thought he could make a profit from the Iron King N if he could acquire it at a fair price (IX Tr. 85).

After reviewing this testimony, Judge Morehouse then stated his conclusions of law:

> The Government, through its expert witnesses, has presented a prima facie case of invalidity, and the burden has thus been shifted to the mining claimant to prove by a preponderance of the evidence that the claim is valid. Having carefully considered a voluminous record, I must conclude that contestee has met this burden with respect to the Iron King N. There is no question that this claim has substantial tonnages of high grade magnetite which is very similar to the high grade magnetite mined on the Willow Creek properties. This ore has, in the past, been used for the various purposes as set out above, and the evidence shows that there are still markets for some of these uses. Even Mr. Hays conceded on cross-examination that this type of ore is useful as a sweetener in electric furnaces. In addition, the coal mining business has expanded rapidly in recent years in the west and particularly in Montana. It is obvious from the testimony in this case that high grade magnetite is valuable as a cleaning agent in coal washing operations. [Emphasis added.]
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> The case for validity for the Fault lode claim is not as strong as that presented for the Iron King N. Nevertheless, it is my view that contestee has presented sufficient evidence of value to preponderate over the Government's prima facie case. The drill hole (designated DH 1958, 1959, Ex. No. R-48, Lerch Assay) slanted under the Fault claim and encountered high grade magnetite (over 60 Fe). Also, lines 10 and 11 on Mr. Newman's magnetic survey map (Ex. No. G-3, App. D), show an increase in magnetic readings as lines approach the Fault claim. These lines were not continued, and no magnetic survey was performed by the Government on the Fault claim. However, Mr. Roberts of U.S. Steel did perform a magnetic survey which indicates possible mineralized zones (see magnetometer lines "B" and "F", Ex. No. R-59) which, when considered with the high grade magnetite from the drill hole mentioned above, together with the extensive magnetite immediately to the northeast on the Iron King N., lead to the conclusion that there are substantial tonnages of magnetite on the Fault claim as well as the Iron King N.

(Decision at 14, 16). Thus, Judge Morehouse found that the claimant had preponderated on the issues presented and therefore found that patents should issue. The Forest Service has appealed from this decision.

With respect to the Iron King N, appellant disputes Judge Morehouse's conclusions emphasized supra. It contends first that the Judge erred in finding that the claim contained a deposit of "high grade magnetite." Appellant asserts that the sampling and assaying done by and on behalf of appellee were selective and did not demonstrate such a deposit, whereas the sampling done by the Forest Service mineral examiner "can be considered representative of the resource on the Iron King N and should have been accorded considerably more weight than the assays submitted by [appellee]" (SOR at 11). Further,

appellant contends that there is no reliable data as to the volume of the deposit and that more exploration is necessary to determine if a successful mine can be developed.

Appellant also takes exception to the Judge's reliance on the testimony of Weissman to establish that a market for magnetite ores exists for coal cleaning purposes. Appellant contends that the Weissman testimony does not indicate that an expanding coal mining business will provide a market for iron ore. Moreover, counsel for appellant charges that the judge prevented her from cross-examining Weissman about such markets. Appellant also contends that the Judge failed to consider beneficiating and other processing costs which would have to be incurred before magnetite could be used in coal cleaning. Appellant asserts that no realistic estimates for marketing the ore for this use are shown in the record.

Appellant also challenges the apparent weight given by the Judge to the possible use of the magnetite as a "sweetener," arguing that Hays' testimony was clearly to the effect that it could not be used as a "sweetener" though it might be added as an oxidizing agent.

Appellant further argues that the Judge failed to address the crucial question, whether ore from appellee's claims "would be appropriate" for either coal cleaning or electric furnaces. Appellant concludes that the evidence is insufficient to show that the ore could be extracted and marketed at a profit for any conceivable use. On this point, appellant challenges the evidence presented by Andrew Kasamis, describing his bid as incomplete and lacking in credibility.

With respect to the Fault claim, appellant contends that the evidence shows neither quality nor quantity of any putative deposit. Appellant disputes the probative value of the Lerch Brothers assays (Exhs. R-52, 54) pointing out that there is no information on how and where samples were gathered or how they were processed. Appellant also argues that that U.S. Steel magnetite survey (Exh. R-59) is clearly unreliable to establish the existence of a mineral deposit on the Fault claim and that Judge Morehouse's reliance on it undermines his legal conclusions. Appellant further contends that the Judge's inference of "substantial tonnages" is supported neither by the drill hole data nor the assays, and is contradicted by the evidence of discontinuous mineralization (lenses and pockets rather than a vein). See Exh. R-7, VIII Tr. 83-84. For these reasons, appellant seeks to have this Board reverse Judge Morehouse's decision as to both claims.

[1] Before examining appellant's allegations, it is useful to briefly sketch the applicable law. When the Government contests the validity of a mining claim on the basis of lack of discovery, it bears only the burden of going forward with sufficient evidence to establish a prima facie case. Once a prima facie case is presented, the claimant must present evidence which preponderates sufficiently to overcome the Government's case on those issues raised. United States v. Springer, 491 F.2d 239, 242 (9th Cir.), cert. denied, 419 U.S. 834 (1974); Foster v. Seaton, 271 F.2d 836 (D.C. Cir. 1959); United States v. Rice, 73 IBLA 128 (1983).

[2] The validity of any mining claim is dependent upon the disclosure of a valuable mineral deposit within the limits of the claim. 30 U.S.C. § 22 (1982). A valuable mineral deposit exists where the mineral found is of such quantity and quality that a prudent man would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a paying mine. Chrisman v. Miller, 197 U.S. 313 (1905); Castle v. Womble, 19 L.D. 455, 457 (1894). This "prudent man" test has been refined to require a showing that the mineral disclosed is "presently marketable at a profit," which simply means that the mining claimant "must show that as a present fact, considering historic price and cost factors and assuming that they will continue, there is a reasonable likelihood of success that a paying mine can be developed." In re Pacific Coast Molybdenum, 75 IBLA 16, 29, 90 I.D. 352, 360 (1983). However, actual successful exploitation need not be shown -- only the potential therefor. Barrows v. Hickel, 447 F.2d 80, 82 (9th Cir. 1971). The question is not whether profits are presently demonstrated, but whether, under the circumstances, a person of ordinary prudence would expend substantial sums in the reasonable expectation that a profitable mine might be developed. Barton v. Morton, 498 F.2d 288 (9th Cir. 1974).

[3] Each claim, in order to be valid, must have an exposure or physical disclosure of a mineral deposit within its boundaries. See United States v. Feezor, 74 IBLA 56, 71, 90 I.D. 262, 270 (1983). Such an exposure may consist of either surface exposures or drill core samples. United States v. Weber Oil Co., 68 IBLA 37, 43, 89 I.D. 538, 540-41 (1982). Where such an exposure exists, and demonstrated values have been high and relatively consistent, geologic inference may be used to show continuity of values. United States v. Feezor, supra at 79, 90 I.D. at 274-75. Whether a geologic inference is warranted, however, is dependent upon the specific facts in each case with due regard to the actual facts known to exist and the reliability of any extrapolations drawn from these facts.

Insofar as the Iron King N claim is concerned, our review of the record herein persuades us that there is a deposit of high grade iron ore on the Iron King N claim sufficient to support a discovery. The Government's own case establishes the existence of a deposit of magnetite. In his report, Newman referred to it twice as a "high grade" deposit (Exh. G-3 at ii, 24). This description of the deposit is supported not only by numerous appraisals of Government mineral examiners, but also by the rather consistent assay results obtained by various assayers over a period of many years. The real question is whether this is a "valuable" deposit of magnetite within the meaning of the mining laws. 8/ There are two separate elements to the Government's argument on this score. The Government contends first, that there

8/ We recognize, of course, that the term "ore" has varying connotations to different individuals. Thus, Newman stated that he used the term in its technical sense, limiting the application of the term "ore" to a mineralized body only where it was shown that the deposit could be marketable at a profit. See III Tr. 84. It is equally clear that others did not so limit themselves,

is insufficient quantity of iron ore to justify development, and, second, any ore mined could not be sold at a profit in any relevant market.

Newman initially calculated the deposit on the Iron King N as containing 200,000 tonnes measured, 903,000 tonnes measured and indicated, and 1,807,000 tonnes measured, indicated, and inferred reserves (II Tr. 8). 9/ Newman testified that he subsequently lowered these estimates after discussions with Hays concerning the density of the deposit. These figures were noted in Judge Morehouse's decision (Decision at 6-7), and were termed reasonable by Hays, who himself calculated somewhat smaller tonnages (Exhs. G-3 at 24; G-10 at 3).

As outlined earlier, Newman made a marketability study and concluded therefrom that extraction, transportation, and other development costs would exceed the value of the deposit on the Iron King N claim. Other Forest Service witnesses concurred in this assessment. The Government's prima facie case against a finding of discovery was established. The question for determination is whether appellee's evidence on the costs of extraction, transporting, and marketing preponderated over that presented by the Government. Insofar as the Iron King N deposit is concerned, we believe that it did.

Initially, we note that the parameters for Newman's cost analysis were established by the Bureau of Mines "Straam System." This system is clearly not without flaws. Thus, Newman testified that he disregarded the transportation figures derived from the Straam system because he felt it was unrealistically high. See II Tr. 30-31. Moreover, the utility of the Straam system analysis for ventures of the size contemplated by appellant seems open to question.

Economies of scale are not straight line functions, particularly where the question is whether or not large capital expenditures will be made. There are numerous situations in which either capital intensive or labor intensive production methods might be pursued. Capital intensive methods might well require high levels of production in order to recoup the initial investment. In such a circumstance, a prime consideration would be whether a mining property possessed sufficient reserves so as to recapture the capital expenditures. Labor intensive methods, on the other hand, while probably resulting in lower production rates, also have concomitantly lower capital outlays to recover. Thus, where reserves are inadequate to justify large scale capital expenditures it may still be possible to mine the deposit using methods that eschew such costs. An individual is not required to show

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fn. 8 (continued)
utilizing the term to cover any area of mineralization. Rather than embracing either approach with respect to the term "ore," we will use the term "mineral deposit" to describe any area of mineralization and the more specific term "valuable mineral deposit" to refer to those areas of mineralization which are capable of successful economic exploitation. See generally United States v. Feezor, supra at 75, 90 I.D. at 272-73.

9/ "Tonnes" are metric or long tons of 2,240 pounds or 1,000 kilograms (Exh. G-3 at 24).

that he has a reasonable prospect of success in developing a state-of-the-art mining facility but only that he has a reasonable prospect of success in developing a paying mine.

Moreover, while purchase of mining equipment might necessitate large scale production in order to recover capital outlays and lower per ton production costs, rental of the equipment or, alternatively, leasing of the property to someone else, may be economic in situations where large-scale development would not be warranted. This is so because those who rent out their own equipment or who enter into leases are, in effect, spreading out the capital costs which they must absorb over the total useful life of the equipment and are not limited to a productive life constrained by the reserves of a specific ore body.

In the instant case, contestee submitted the testimony of Kasamis who had submitted a bid to mine and crush 30,000 tons of magnetite at a cost of roughly $4.73 per ton, which should be contrasted with Newman's estimate of $7.48 per tonne for direct mining costs alone (II Tr. 23). 10/

We recognize that appellant disputes Kasamis' evidence. We are aware that his long association with Whittaker may give rise to concerns as to his impartiality and objectivity. However, as a mine manager, he must be regarded as having some skill in preparing estimates concerning the extraction and removal of a deposit of ore he had examined. His testimony revealed his expertise (see especially cross-examination, VII Tr. 24-27). Moreover, his credibility was illustrated by his appraisal of the Fault claim:

> Q If you had gone out and examined just the Fault claim and not the Iron King N., would you consider leasing that Claim for its mineral value?
>
> A (BY MR. KASAMIS) No.

(VII Tr. 22).

We believe that Judge Morehouse was justified in placing some weight on his testimony.

The costs of mining and milling the ore, of course, are relevant only if a market exists for the ore. And it was to this point that much of the Forest Service's testimony was directed. Thus, Hays, who was clearly an expert on iron ore, stated generally that because of a lack of reserves and its location (which would result in increased transportation costs) no market would exist for any ore from the claims. See generally VIII Tr. 128-31.

On the other side of the ledger, however, appellee submitted testimony of some past sales. The earliest evidence of extraction, shipment,

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10/ Converting Newman's estimate from long tons to short tons results in a mining cost of $7 per ton.

and sale to the AEC is well established. Other small sales occurred in 1959. In 1976, appellee signed the lease-option agreement with NMC under which he received payments, even though the option to purchase was never executed. While Exhibit R-61, the packet of inquiries seeking quotes and terms, relates generally to inquiries in the later 1950's and early 1960's, it is an evidentiary counter weight to the Government's negative marketability studies, because it demonstrates, at least in that period, a wide range of interest in appellee's ore.

More importantly Weissman's testimony related to a present-day market for magnetite as a coal cleaning agent. Appellant challenges this evidence particularly on the ground that Judge Morehouse prevented cross-examination on this point. The crux of Weissman's testimony was that he was involved in negotiations with a potential purchaser of appellee's ore. When he declined to reveal the name of the potential purchaser, counsel for appellant asked how far the coal operator was from Stanford, Montana. At that point the following colloquy ensued:

> MR. MOREHOUSE: The sale hasn't been made yet and this testimony is going to have to stand on the basis of a certain degree of speculation. The deal hasn't been closed yet but I think, in effect, his testimony is that somebody is interested in high grade magnetite ore. We already had the testimony in this record that one of the uses for high grade magnetite ores is coal cleaning. I can't remember where it came from but I know it's already in the record. I think we have to honor Mr. Weissman's confidentiality in negotiations. You can put on testimony in rebuttal that this would not be suitable stuff to clean coal.
>
> MS. CHRISTENSEN: Okay. I will withdraw my question.

(IX Tr. 26).

As to coal cleaning, the record indicates that the magnetite on the Iron King N is amenable to use for this purpose. We are not free to disregard the Weissman testimony that negotiations to sell the ore for this purpose were pending at the time of the hearing. Nor was counsel for appellant totally precluded from exploring this question as alleged on appeal. She withdrew her inquiry without objection and appeared to agree that the confidentiality of ongoing negotiations should be respected. See IX Tr. 31. The quantum of probative value assigned by the judge to evidence concerning those two uses of the ore is not readily discernible. We think, however, that the Weissman testimony, as well as appellee's correspondence with Bethlehem Steel, are material to the question whether a reasonable expectation was justified that at least a limited market existed at the time of the hearing.

We agree with appellant that Hays did not testify that a market existed for lump magnetite ore as a "sweetener." He did, however, clearly state that it might be used as an oxidizing agent, though he questioned the real utility of such use (VIII Tr. 151).

Essentially, the crux of the marketability question in the instant case revolves around a conflict in testimony. The Forest Service presented the testimony of Newman and Hays, both of whom qualified as experts, that the magnetite ore on the Iron King N claim did not constitute a valuable mineral deposit because of the inadequacy of the reserves and the distance from any relevant market. Contestee presented evidence both of past sales (admittedly of relatively small amounts) as well as present and future markets. Judge Morehouse, who had an opportunity to observe the various witnesses and ascertain their credibility, clearly was persuaded that appellee's evidence was believable. In United States v. Chartrand, 11 IBLA 194, 80 I.D. 408 (1973), the Board noted:

> This Department has a long-standing practice of affording considerable weight to the findings of the trier of fact at an administrative hearing. The reason for this practice is because the trier of fact who presides over a hearing has an opportunity to observe the witnesses, and is in the best position to judge the weight to be accorded conflicting testimony. * * * We recognize that the Board of Land Appeals has authority to reverse the fact findings of a Judge; however, where, as here, the resolution of a case depends primarily upon his findings of credibility, which in turn are based upon his reaction to the demeanor of witnesses, his findings will not be lightly set aside by this Board. [Citations omitted.]

Id. at 212, 80 I.D. at 417-18. In light of Judge Morehouse's implicit credibility findings and in the absence of any compelling evidence or legal considerations which might justify us in overruling his determination on this point, the Board affirms his decision insofar as the Iron King N is concerned.

We turn now to the Fault claim. Inasmuch as appellee alleged a discovery of clay and dolomite 11/ in addition to iron ore, we will first briefly discuss this issue. In his decision, Judge Morehouse found that to the extent that the claim embraced minerals such as clay and dolomite, common varieties of which were withdrawn from location by the Act of July 23, 1955, 30 U.S.C § 611 (1982), viz., the minerals were a common variety and thus not subject to location (Decision at 15). We agree. The testimony as to the clay deposit was to the effect that it was quite limited in areal extent and no testimony was presented with reference to the dolomite that would justify a finding that it contained properties giving it a distinct and special value over other commonly occurring dolomites.

Ultimately, the validity of the Fault claim must turn on whether or not contestee has established the existence of a magnetite deposit of sufficient quantity and quality so as to justify a prudent man in the further

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11/ There was clearly some confusion on this point in the record. Compare II Tr. 54 with II Tr. 79-80. It seems reasonably clear that in addition to an iron ore discovery, contestee was alleging discoveries of clay and dolomite.

expenditure of his labor or means with a reasonable prospect of success in developing a paying mine. Based on the results of a 1958-59 drill hole, the increase in magnetic activity shown on lines 10 and 11 of Newman's magnetic survey (Exh. G-3, App. D) and the U.S. Steel survey (Exh. R-59), Judge Morehouse concluded that there were substantial tonnages of magnetite on the Fault claim (Decision at 16). For reasons which we will set forth, we do not agree.

At the outset, we wish to note that the case presented by Appellee for the Fault claim was significantly weaker than that presented with reference to the Iron King N. For one thing, no mining of ore had occurred on the Fault. In explaining this, Whittaker stated:

> Q * * * [D]id you develop the Fault lode claim? Did you mine any ore there?
>
> A No.
>
> Q Why not?
>
> A Because the overburden depth there is considerably more than it is on the Iron King N., and it would be economically unfeasible to dig ore at a greater depth when you've got it on top of the ground. It's that simple.

(XII Tr. 12). As we also noted infra, Kasamis expressly declared that he would not have considered leasing solely the Fault claim (VII Tr. 22). Thus, even appellee's evidence gives rise to substantial doubts as to the marketability of any magnetite underlying the Fault claim.

More critically, we do not believe that appellee's evidence establishes the existence of a deposit of magnetite on the Fault claim, much less the existence of a valuable deposit.

The evidence is clear that there is no surface outcropping of magnetite on the Fault claim nor any such exposure. 12/ The only direct evidence of the presence of magnetite on the claim consists of Whittaker's testimony concerning three drill holes, and a number of references to a magnetite deposit in various reports. See, e.g., Exhs. R-1, R-41, R-43. One of these drill holes was the drill hole referenced by Judge Morehouse in his decision. The others, according to Whittaker's testimony, consisted of a hole drilled to the depth of 16 feet in which no ore was discovered (X Tr. 12), and another, of unstated depth, which Whittaker testified encountered ore "right at the creek level" (X Tr. 11). The testimony as to this latter drill hole is so indefinite and fragmentary that it is difficult to accord it any evidentiary weight. It is clear from an analysis of Judge Morehouse's conclusions that he, too, did not accord the testimony as to this drill hole any probative effect.

12/ The only iron ore which was exposed on the claim was limonite, a low-grade iron ore useful in pigmentation. See IX Tr. 70-71, X Tr. 19.

Thus, the only drill hole supportive of contestee's position is the one relied upon by Judge Morehouse in his decision. Counsel for the Forest Service, however, correctly points out that the evidence with respect to this drill hole was somewhat contradictory. Thus, Whittaker testified that it was drilled to a total depth of 188 feet at an angle of 45 degrees and showed iron ore over the last 8 feet (VII Tr. 88-89). Later, however, he stated that it was drilled at an angle of 30 degrees and that the last 12 feet were in ore (X Tr. 9-10). He testified that the hole was drilled in 1958 and 1959 and further stated that he believed Sievers (the author of a favorable mineral report (Exh. R-1)) had witnessed the hole being drilled. It is clear, however, that the Sievers report was written in 1957. See Exh. R-1. 13/ These points do undermine the weight that could be accorded Whittaker's testimony. However, even granting that the subject drill hole encountered iron ore at its termination point, we could not find that this, without more, would justify a finding that a mineral deposit had been discovered.

In United States v. Feezor, supra, we noted that geologic inference could be used to show continuity of values "where values have been high and relatively consistent." Herein, however, we have only a single drill hole, which, at best, encountered iron ore over the last 12 feet of a 188-foot hole. Standing by itself, we do not see how geologic inference could be used to establish a significant deposit of iron ore of consistent values, based on a single drill hole which penetrates a body of ore, only for a distance of 12 feet, at a depth over 100 feet below the surface.

Judge Morehouse relied on the fact that two lines of Newman's magnetic traverses showed an increase as they approached the west sideline of the Iron King N, in the area where the Fault claim adjoined it. 14/ These lines, however, were not run into the Fault claim. It is impossible, based on the data submitted with reference to Newman's magnetic survey, to determine whether these readings were anomalies, or possibly indicative of an ore body. Even if the data showed an ore body, there was no indication as to its size nor any evidence that it persisted beyond the sidelines of the Iron King N. 15/

It seems clear that Judge Morehouse's conclusion that a valuable ore body existed on the Fault claim was, to a large extent, predicated upon a magnetic survey performed by United States Steel in 1959. The survey map and

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13/ The Forest Service also argues that contestee's drilling logs, which were apparently submitted as Exhibit R-80, do not show any drilling on the Fault claim. We have been unable to locate this exhibit, however. See also letter of Mar. 28, 1984, from Judge Morehouse to Ronald C. Drummond, Court Reporter. We have therefore not relied on this exhibit in making our decision.

14/ See note 2, supra.

15/ Inasmuch as nearly all of the experts agreed that the iron ore deposits in the Running Wolf District were lenticular, one would not be justified in assuming a continuation beyond the lines of the traverses.

traverse lines were submitted as Exhibit R-59. A cursory review of the map would, indeed, support Judge Morehouse's conclusions. However, a detailed analysis reveals that the map is flawed in so many ways that no reliance thereon can be justified.

The map consists of a grid, on which are shown various roads, certain workings, and the magnetometer lines run in 1959. This map also contains the outline of both the Iron King N and Fault claims. It also shows, colored in pink, areas denominated as "possible mineral zones." This map shows a very large possible mineralized zone covering a substantial portion of the east third of the Fault claim. Were we convinced of the accuracy of this map, we would agree with Judge Morehouse's conclusion that the evidence of the drill hole together with the magnetic readings would support a geologic inference that a substantial body of iron ore underlay the Fault claim. However, this map is clearly not accurate.

On the map the Iron King N is outlined in blue, while the Fault claim is outlined in green. It is unclear whether the claim outlines were placed on the map by Roberts, who conducted the survey, or someone else. What is clear is that the claims are not correctly depicted.

The map is drawn to a scale of 1 inch to 200 feet. As shown on the map, the dimensions of the Iron King N are 300 by 1,175 feet, while the Fault claim is shown as 300 by 1,075 feet. In actual fact, as surveyed for contestee's patent application, the Iron King N claim is 600 by 1,491 feet and the Fault claim is 522 by 1,488 feet. Moreover, as surveyed, the north sideline of the Fault claim is approximately 324 feet from the north endline of the Iron King N claim. Yet, on the map, even though the claims are shown as smaller than they are in reality, the distance between the north sideline of the Fault and the north endline of the Iron King N is about 550 feet. Other salient points are as follows: (1) the 1959 map shows a road crossing the Iron King N and bowing back to it about 100 feet inside the Fault claim; the survey shows this same road over 50 feet within the Iron King N claim; (2) the 1959 map shows a road, which eventually forks with a spur going to contestee's cabin, as completely north of the Fault claim, generally more than 100 feet north of the north sideline; the survey shows this area within the claim by almost 200 feet; (3) as surveyed the Iron King N west sideline bears N.31 degrees 20'W.; on the 1959 map the west sideline bears approximately N.42 degrees W.; (4) as surveyed the Fault north sideline bears N.64 degrees 07'E.; on the 1959 map this sideline bears N.47 degrees E.

It is not merely the locus of the two claims that is in error; the situs of various physical structures such as roads differs significantly between the 1959 map and other maps used at the hearing. For example, a road crosses the north half of the Iron King N and soon thereafter forks. The north branch of this road continues across the Iron King N into the Fault and forks again. These roads are shown on both the 1959 map and Exhibit R-48, which were maps drawn by Newman on the basis of the mineral surveys. However, the distance between the two forks on the 1959 map is 700 feet. On Exhibit R-48 the distance is nearly 950 feet. And, in fact, if contestee drilled the 1958-59 drill hole where he indicated on Exhibit

R-48, it would have been located north of a fault line which the 1959 magnetic survey map shows cuts off mineralization to the north and thus could not have intercepted the iron ore body shown on Exhibit R-59 assuming, as Whittaker testified, that he angled the hole due west. In view of all of these considerations, we agree with appellant that Judge Morehouse was not justified in relying upon the 1959 map to show
the existence of a valuable mineral deposit on the Fault claim. See United States v. Larsen, 9 IBLA 247, 262 (1973), aff'd, Larsen v. Morton, CIV No. 73-119 TUC-JAW (D. Ariz. Oct. 24, 1974). Accordingly, his decision finding that contestee had preponderated on the question of whether a valuable mineral deposit had been shown to exist on the Fault claim must be reversed and the claim declared null and void. 16/

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed as to the Iron King N claim and reversed as to the Fault claim, and the Fault claim is hereby declared null and void.

James L. Burski
Administrative Judge

We concur:

Franklin D. Arness
Administrative Judge

Will A Irwin
Administrative Judge

16/ We wish to briefly address two issues which appellee pressed before Judge Morehouse which regain some relevance in light of our disposition of the Fault claim. First, contestee argued that inasmuch as the contest in the instant case was not initiated until more than 2 years had elapsed from the issuance of final certificate, the contest is barred by the provisions of section 7 of the Act of Mar. 3, 1891, 26 Stat. 1098, 43 U.S.C. § 1165 (1982). See also 43 CFR 1862.6. This is not correct. In Palmer v. Dredge Corp., 398 F.2d 791 (9th Cir. 1968), the court expressly held that this Act "has no application to the mining laws or those making claims under the mining laws." Id. at 795.

The second issue revolves around whether contestee was required to show marketability of the deposit as of the time of the issuance of final certificate or at the time of hearing. This question usually does not arise because of the close proximity that normally obtains between issuance of the final certificate and commencement of the contest. In the instant case, the inordinate delay in filing the complaint engendered a concern that a different substantive result might obtain depending upon the specific period of time at which present marketability might be judged. But see In re Pacific Coast Molybdenum, supra. This issue, however, is not critical to our determinations with respect to either claim, since we found that a discovery has existed on the Iron King N at all critical points and that no deposit of iron ore has ever been disclosed within the limits of the Fault claim. Accordingly, we decline to rule on this question beyond noting that we view it as one involving complexities which are not easily resolved.